

Schooling, Occupational Motivation, and Personality as Related to Success in Paramedical Training

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THE ROLE OF ALLIED HEALTH WORKERS in the United States has been expanding rapidly during recent years in response to widespread demands for cost effectiveness in the delivery of medical care. Currently, more than 2,500 training programs for allied health workers are approved by the American Medical Association (1), and this manpower is projected to increase from the approximately 900,000 workers tabulated in 1971 to 1.3 million workers by 1980 (2). Also, physicians are beginning to allow increasing numbers of these workers to perform primary care functions in order to make medical services more widely available (3,4). As larger numbers of paramedical personnel assume broader responsibilities, greater attention must be given to their selection and training.

Hospital corpsmen (HMs) constitute the largest group of paramedical personnel in the U.S. Navy. They perform such diverse functions as screening and diagnosing health problems of outpatients, giving emergency treatment to severely ill or injured patients, providing nursing care for hospitalized patients, running laboratory tests and operating radiological equipment, maintaining health records, and supervising other health

care personnel. They comprise approximately 80 percent of the Navy's Medical Department manpower, and increasing numbers are being assigned tasks that until recently had been reserved exclusively for physicians, nurses, and other health care professionals.

To improve the selection and use of HMs, research designed to identify both personal and organizational factors that contribute to their health, satisfaction, and performance has been initiated at the Naval Health Research Center in San Diego, Calif. (5). The approach taken in this research has been primarily longitudinal. In the phase of the research described here, psychological measures obtained on a cohort of recruits at the beginning of hospital corpsman training were related to their subsequent success in training.

The first hurdle confronting recruits who are selected to become HMs is a 3-month training course. During it, trainees found to be unsuited for such work are disenrolled. Although completion of training does not of course guarantee that graduates will perform effectively on the job, disenrollment guarantees that they will be unable to perform since they will not even be assigned to hospital corpsman jobs. Thus, disenrollment represents an error in the selection of recruits for work in the health care field. One objective of our research, therefore, was to identify with greater accuracy those persons who would be most likely to successfully complete paramedical training.

A growing body of literature suggests that occupational success is determined not only by the capacity to perform but also by the will to perform (6-9). At present, however, assessment of a recruit's potential for successful completion of HM training is based upon stand-

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ard Navy aptitude measures (10). It seemed to us that this assessment would probably be more accurate if a recruit's noncognitive characteristics, such as prior school experience, motivation for working in a health care job, and personality, were also evaluated. Aptitude measures can provide information on a recruit's ability to succeed in HM training, but a record of prior successful schooling, expressed motivation for a health care job, and self-described personality characteristics congruent with the occupational demands of such jobs can aid in identifying those candidates who want to perform well in HM training.

Therefore we sought to identify the variables that seemed to be associated with success in Navy paramedical training. More specifically, answers were sought to the following questions:

1. Are the noncognitive variables of prior school experience, motivation for working in a health care job, and personality related to successful completion of hospital corpsman training?

2. Do measures of these noncognitive variables add much to the accuracy of aptitude measures in estimating a person's chances for success in training?

Method

Sample. The 3,747 participants in the study included 3,087 Navy enlisted men and 660 Navy enlisted women who entered hospital corpsman class A training at San Diego, Calif., and Great Lakes, Ill., between February and August 1973.

Training course. The hospital corpsman training course lasts 14 weeks and covers material pertaining to anatomy and physiology, principles and techniques of patient care, first-aid and emergency procedures, dispensing of medications and their therapeutic effects, techniques of preventive medicine, and mathematics. The last 2 weeks of training include field experience in performing emergency procedures as well as job experience on hospital wards. Approximately 73 percent of the study subjects completed the course.

Measures. The standard Navy aptitude tests that are routinely administered during recruit training include a general classification test (GCT) and an arithmetic reasoning test (ARI). The GCT and ARI scores are summed to arrive at a single index of aptitude. This combined score is used by recruiters and classifiers in selecting recruits for assignment to HM training.

In our study, in addition to the GCT and ARI, a background information (BI) form, which had been prepared for this research, and a personality questionnaire were administered to the study subjects at the beginning of their paramedical training. The number of years of school completed before entry into the service and the number of suspensions or expulsions from school (not exceeding five) were derived from

the BI forms. We assessed each subject's motivation for working in a health care job by combining responses to nine BI items on occupational preference, the person's experiences with job classifiers, and satisfaction with occupational assignment (11). Personality was measured by the Comrey personality scales (12), comprised of 180 items. Based on a person's self-reporting, these scales are designed to assess eight dimensions of personality and two types of test-taking responses.

Analysis. We computed means and standard deviations for the measures of academic aptitude, schooling, motivation, and personality for both graduates and disenrollees in the study sample; point biserial correlations were computed to test the significance of the differences between these means. Stepwise multiple regression procedures (13) were then used to determine the composite validity of the variables for predicting completion of HM training. We stopped adding variables to the regression equation when the contribution of a new variable to the composite validity ceased to be significant at the 0.05 level of confidence. To better evaluate the usefulness of the equation resulting from a combination of these variables, regression analysis was performed only on half of the sample, taken at random. The scores that were computed with the resulting equation were then correlated with completion of training for the remaining half of the sample. Finally, on the basis of the variables, tables were constructed to aid in predicting completion of training.

Results

Student aptitude, prior school experience, occupational motivation, and personality were found to be significantly related to completion of Navy paramedical training. The means and standard deviations on these variables for both graduates and disenrollees are shown in table 1, along with the point-biserial correlations that we computed to test the significance of the mean differences. Recruits who completed the training course tended to score higher on the aptitude tests, to have completed more years of schooling before entry into the service (with fewer suspensions or expulsions), and to report greater motivation for working in a health care job than did students who were disenrolled during the training period. On the personality measure, students who were successful in their paramedical training tended to describe themselves more frequently than those who were unsuccessful as believing in other people's basic honesty, trustworthiness, and good intentions; as being hard working, energetic, and striving to excel; and as feeling happy, calm, stable in mood, and self-confident. Finally, those recruits who were successful in their training tended to respond more attentively to the personality questionnaire than did the unsuccessful recruits.

When these variables were combined by regression procedures into a single composite measure, the indices

Table 1. Relationship of aptitude, prior schooling, motivation, and personality to graduation from hospital corpsman training

Variables	Graduates		Disenrollees		r
	Mean	SD	Mean	SD	
Aptitude (GCT+ARI)	111.6	13.1	99.3	11.3	¹ 0.40
Prior schooling:					
Years of school	12.4	1.3	11.4	1.3	¹ .32
Suspensions	0.3	0.9	0.9	1.4	¹ -.22
Occupational motivation	52.1	8.8	44.3	11.1	¹ .35
Personality:					
Trust	84.3	11.6	81.4	11.5	¹ .11
Order	93.7	14.0	91.4	14.3	.07
Conformity	89.1	14.5	87.6	14.7	.05
Activity	97.5	13.2	92.7	14.6	¹ .15
Emotional stability	99.3	14.7	93.0	15.8	¹ .18
Extraversion	89.4	19.3	88.0	18.5	.03
Masculinity/femininity	86.0	13.9	84.6	13.9	.05
Empathy	102.2	13.9	99.8	15.5	.07
Validity	14.8	5.7	17.1	6.9	¹ -.16
Response bias	51.4	8.7	51.2	8.9	.01

¹ P < 0.001.

of prior school experience, occupational motivation, and personality added significantly to the validity of the aptitude measure as a predictor of completion of paramedical training. The results of this analysis are shown in table 2. The measure of aptitude was the first variable included in the regression composite. Next were added, in the order of their contribution to the validity of the composite, occupational motivation, years of schooling completed before entry into the service, and number of suspensions or expulsions from school. Less substantial, although statistically significant, contributions were made to the validity of the composite by the scores on the Comrey emotional stability and validity scales. Taken together, these variables had a validity of 0.50 for predicting training completion for both halves of the study sample. This result indicates that future use of the composite for selecting candidates for hospital corpsman training should be of similar validity.

Table 2. Standard score weights and cumulative multiple correlation for the regression equation developed to predict success in hospital corpsman training

Variables	Standard score regression weights	Cumulative multiple R ¹
Aptitude (GCT+ARI)	0.248	0.395
Occupational motivation179	.455
Years of school151	.482
Suspensions	-.098	.491
Validity	-.064	.496
Emotional stability050	.498

¹ Each increase in the multiple correlation is significant at or beyond the 0.05 level of confidence.

The last step in our study was to devise a practical means of applying the results to the screening of candidates for paramedical training. Simplicity is of overwhelming importance in devising a screening tool for job classifiers. Therefore, although the equation in table 2 permits the best use of the study results in terms of most accurately identifying the recruits who can be expected to succeed in training, it may constitute a less useful screening device than a simpler, somewhat less accurate combination of the variables considered. For that reason, based on hospital corps training criteria, the aptitude scores of the sample were divided into three categories labeled high (105 or higher), medium (95-104), and low (94 or lower). The variable of prior school experience was simplified by subtracting, from each year of school completed, 1 year for each suspension or expulsion (not exceeding five). Finally, the trainees were rated as either high (52 percent of sample) or low (48 percent of sample) on the occupational motivation measure. Tables were then constructed relating these variables to the trainees' chances of completing paramedical training. Comrey personality scores were not included in these tables because of the relatively small contribution that those variables made to the prediction of completion of training compared with the cost and difficulty of obtaining the information.

Aptitude and prior school experience were used in constructing table 3, because this information is the easiest for job classifiers to obtain. This table shows that information on prior school experience adds considerably to the accuracy of estimating a recruit's chances of completing paramedical training. For high-aptitude trainees, the chances of school completion ranged from 10 in 10 to 6 in 10, depending on their school records. The chances of completing training for trainees of

Table 3. Trainees' chances of completing hospital corpsman course, by school experience before entry into service and aptitude level

Scores for prior school experience ¹	Number of trainees	Chances in 10
<i>High aptitude</i>		
3-9	143	6
10-11	357	8
12	919	9
13-17	672	10
<i>Medium aptitude</i>		
3-9	149	4
10-11	256	5
12	428	7
13-17	155	8
<i>Low aptitude</i>		
3-9	100	2
10-11	167	3
12	167	5
13-17	71	7

¹ Computed by subtracting from years of school completed, 1 year for each suspension or expulsion from school (not exceeding 5).

NOTE: Analysis did not include 163 trainees whose scores for aptitude or school experience were missing.

Table 4. Trainees' chances of completing hospital corpsman course, by school experience before entry into service, aptitude level, and occupational motivation

Scores for prior school experience ¹	Chances in 10 of completing course	
	High occupational motivation	Low occupational motivation
<i>High aptitude</i>		
3-9	7	5
10-11	9	7
12	9	8
13-17	10	9
<i>Medium aptitude</i>		
3-9	5	4
10-11	7	5
12	8	6
13-17	9	7
<i>Low aptitude</i>		
3-9	3	2
10-11	3	3
12	7	4
13-17	8	6

¹ Computed by subtracting from years of school completed, 1 year for each suspension or expulsion from school (not exceeding 5).

medium aptitude ranged from 8 in 10 to 4 in 10, depending on their school experience. In table 4, the occupational motivation measure has been added to the measures of aptitude and prior school experience. The table illustrates how an index of motivation can further improve the accuracy of predictions of training completion. As would be expected, at each level of aptitude and at each level of schooling except one, the more motivated recruits had a better chance of completing training than the less motivated.

Implications

The results of this study afford further support for those researchers who have suggested that success in training or on the job is determined not only by the capacity to perform but also by the will to perform. The variables of years of school completed and disciplinary experiences with school authorities almost certainly reflect, in addition to ability, an indication of the person's desire to perform satisfactorily in his or her community. In addition, the measures of occupational motivation used in this study can aid in assessing motivational concerns specifically related to the Navy's occupational assignment process. All three of these measures of desire to perform can add considerably to the accuracy of predictions of success in paramedical training.

The significant relations observed between the study subjects' scores on the Comrey scales and their training success suggest that personality questionnaires that seek to identify the characteristics of "normal" persons may be more useful as predictors of success in paramedical training than those designed to detect pathological deviations. The Minnesota Multiphasic Personality Inventory (MMPI) scales have not proved to be successful as predictors of paramedical training performance (14, 15). In contrast to the subjects that the MMPI was designed to test, the Comrey scales were especially devised for use with persons who are not classified as mentally ill. Furthermore, scores on the Comrey scales have been found to be related to training success not only in our study, but also in a similar one conducted on hospital corpsmen assigned to training in a field medical service school (16).

The results of our study have direct implications for the guidance of recruits into Navy health care specialties. Since information on aptitude and prior school experience is readily available to job classifiers, table 3 could easily be applied to the screening of candidates for hospital corpsman training. For example, by guiding into the paramedical specialties only those recruits in the present sample who had chances of 7 in 10 or better of finishing training, 60 percent, or 558, of the disenrollees would have been eliminated, at the cost of losing 17 percent, or 447, of the actual graduates. This selection strategy would have reduced the school attrition rate from 27 percent to 15. If table 4 had been applied to the study sample, and only those recruits with

a 7 in 10 or better chance of finishing training had been accepted, the training attrition rate would have been further reduced from 15 percent to 13.

The variables and methods evaluated in this study should be useful in screening candidates for other health care jobs. In nonmilitary training programs at the entry level, such as training programs for emergency medical technicians or psychiatric aides, the performance of trainees might be significantly increased by using a combination of measures of noncognitive characteristics, as well as measures of aptitude, to screen applicants. The widespread availability of computers would make it relatively easy for other training programs to apply the regression methods described to draw up revised selection standards. Furthermore, when it is not feasible to use a complicated regression equation to evaluate a candidate's qualifications, several types of information can be combined in a simple way to obtain a single index of the candidate's chances of training success.

Completion of paramedical training is a necessary step in becoming an effective health care specialist, but it is not the only factor in on-the-job success. Assignment to hospital corpsman training of recruits who are predisposed to disenroll clearly results in substantial waste. Completion of training, however, is only an intermediate criterion of the accuracy of the selection process. Research is presently underway to determine the validity of measures of aptitude, prior schooling, motivation, and personality in predicting post-training job effectiveness. Some of the factors in performance of hospital corpsmen on the job will be the subject of future studies.

References

1. Hessler, R. M., and Griffard, C. D.: Community health paraprofessional: The occupation of not quite. *Inquiry* 13: 90-94 (1976).
2. Pennell, M. Y., and Hoover, D. B.: Allied health manpower supply and requirements: 1950-1980. *Health Man-*

- power Source Book 21. PHS Publication No. 263. U.S. Government Printing Office, Washington, D.C., 1970.
3. Glenn, J. K., and Goldman, J.: Task delegation to physician extenders—some comparisons. *Am J Public Health* 66: 64-66 (1976).
4. Barrish, N. H.: Professional judgment and the use of auxiliaries. *Am J Public Health* 65: 972-975 (1975).
5. Booth, R. F., and Berry, N. H.: The selection and evaluation of Navy paramedical personnel. *Campus* 5: 26-29, March 1976.
6. Vroom, V. H.: *Work and motivation*. John Wiley & Sons, Inc., 1964.
7. Wilkins, W. L.: Attitudes and values as predictors of military performance. *In Manpower research*, edited by N. A. B. Wilson. English Universities Press, London, 1969.
8. Crites, J. O.: *Vocational psychology*. McGraw-Hill, Inc., New York, 1969.
9. Campbell, J. P., Dunnette, M. D., Lawler, E. E. III, and Weick, K. E., Jr.: *Managerial behavior, performance, and effectiveness*. McGraw-Hill, Inc., New York, 1970.
10. Thomas, P. J.: The relationship between Navy classification test scores and final school grades in 98 class "A" schools. Research report SSR 72-22. Navy Personnel and Training Research Laboratory, San Diego, Calif., 1972.
11. Booth, R. F., Hoiberg, A. L., and Webster, E. G.: Work role motivation as a predictor of success in Navy paramedical training. *Milit Med* 141: 183-187 (1976).
12. Comrey, A. L.: *Manual for the Comrey personality scales*. Educational and Industrial Testing Service, San Diego, Calif., 1970.
13. Kerlinger, F. N., and Pedhazur, E. J.: *Multiple regression in behavioral research*. Holt, Rinehart and Winston, Inc., New York, 1973.
14. Crovitz, E., Huse, M. M., and Lewis, D. E.: Selection of physician's assistants. *J Med Educ* 48: 551-555 (1973).
15. Johnson, L. C., Pollard, J., and Plag, J. A.: Predicting the academic performance of Navy hospital corpsmen. Research report No. 67-29. Navy Medical Neuropsychiatric Research Unit, San Diego, Calif., 1967.
16. Booth, R. F., McNally, M. S., and Berry, N. H.: Background and personality characteristics related to student satisfaction and performance in field medical service school. Research report No. 76-19. Naval Health Research Center, San Diego, Calif., 1976.

SYNOPSIS

BOOTH, RICHARD F. (Naval Health Research Center, San Diego), WEBSTER, EVELYN G., and McNALLY, MICHAEL S.: *Schooling, occupational motivation, and personality as related to success in paramedical training*. *Public Health Reports*, Vol. 91, November-December 1976, pp. 533-537.

Measures of prior school experience, motivation for working in a

health care job, and personality were evaluated as potential predictors of success in Navy paramedical training. When, by multiple regression procedures, years of school completed, numbers of suspensions or expulsions from school, occupational motivation, and Comrey personality scale scores were combined with an aptitude measure that is used for guiding recruits into paramedical training, the cross-validity for predict-

ing training completion was significantly increased ($P < 0.001$) from 0.40 to 0.50. Practical means for applying these measures to the screening of candidates for paramedical training were developed.

Results of the evaluation suggest that guiding people into jobs that they neither prefer nor perceive as congruent with their abilities and interests can significantly reduce the chances for occupational success.